in a very satisfactory manner. As a laboratory guide the work is perhaps a little too voluminous, 540 pages. It is divided into two portions, the first requiring work with the simple microscope, and consists of a series of lessons inductively arranged, which leads the student from a study of the root through the types of the largest families to a study of the seed and embryo. They are designed to give to the student a familiarity with the various forms, without burdening him with the technical descriptive terms, which are, however, summed up in tabulated plates for reference. The full-page illustrations of the first portion are numerous, very simple, excellently drawn and well printed.

The second portion of the volume, 270 pages, on vegetable histology, opens with a chapter on the compound microscope and the use of micro-chemical reagents, and is accompanied by excellent and practical tables of reagents and stains. The purpose of this volume limits its scope. It makes a good working guide to put into the hands of students who can give but a limited time to the study, but further than that, as a work upon vegetable histology, it is meagre.

The arrangement of this portion of the work is less commendable than the first. Its numerous illustrations can be classed as most good, few bad and a number indifferent, in general the simple elements of tissues being good, whereas those showing the tissues themselves, especially the more complex ones, are less to be approved.

The work is one which is admirably adapted for the use of students in pharmacy, for which it was probably first intended, and in the hands of a guide whose methods were similar to those of the writer, we conceive it to be excellent. In general its scope is limited; it gives facts but fails, we think, to point out those logical sequences of growth and development that lead the student to a rounded conception of the science of botany; it nevertheless is by far the best laboratory guide we have seen for directors of laboratories who wish to give their students a practical elementary knowledge of botany.

S. E. JELLIFFE.

Principles and Practice of Agricultural Analysis.—By HARVEY W. WILEY, Chemist of the U. S. Dept. of Agriculture.—Easton, Chemical Publishing Co., 1894. Vol. I.

We have already called attention to the first part of this admirable work, now being published in monthly installments by the Chemical Publishing Company, and need not again speak of its general excellence of plan. If any fault is to be found with the work it is with its limited title, which is rather apt to mislead some into a supposition that the book will be of service only to the analyst, and as a laboratory manual alone. The twelve parts which have now appeared, nearly 600 pages in all, indicate a work of much broader scope, one which no scientific library can afford to omit from its catalogue. Of the first of the series we have already spoken. In No. 2 the subject of soils and soil formation is continued, the action of earth-worms, bacteria, air, etc., the qualities of the various soils and the discussion of certain peculiar soil types. An interesting chapter on sampling follows, and here is discussed in principle and practice all of the accepted methods now in use in various countries and among the leading workers in agricultural science. The study of the physical properties of soils and the description of methods of mechanical and microscopical analysis, etc., occupies some 200 pages, while the methods of chemical analysis, begun in No. 7 of the series, extends to the present issue. We know of no other work approaching the present in completeness and scientific value. The exhaustive treatment of the subject leaves nothing to be desired, and it would be difficult indeed to criticise any of its features. At the end

of each part is a Bibliography of works cited, and an inspection of these lists at once indicates the labor entered upon by the author, as well as that saved to those who have now the benefit of his research.

PHILADELPHIA. CHARLES PLATT.

Nitrogen and Water, or the Water Atoms and Their Relations. Part—The Earth's Atmosphere, by WILLIAM COUTIE.

The author of this polygraph of 31 pages is good enough to assure us that some things remain undiscovered, or at any rate we infer this to be his meaning. To discover the real meaning of many of his sentences would require the application of the calculus, since his thoughts soar off into space in what are apparently curved lines. It is probable that minds of the earth, earthy, like that driving this pen, are incapable of fully grasping the mighty thoughts here set forth. They are certainly startling and go to the root of all things.

It appears that we have all been mistaken in our conception of the design of Creation, at least those who have ventured to form any such conception have been mistaken. The real reason is thus set forth:

"It is evident that it is the law of change that gives the Creator some work to do and something that is new in all time. It is thus to Him the most important of all, for it is to Him preëminently omnipresent, universal and in all things forever new, and without it time would be a monotony and a burden, almost everything would be old and He would have nothing to do."

The following whack at our biological brethren is commended to their attention; their disgraceful Darwinian tendencies make it deserved, if somewhat severe:

"If we now turn to the results in time we find that, first, horse in our knowledge was of the size of a fox and walked on his heels. Now all horses of every kind walk on the point of their longest toe, and they are all many times the weight of a fox. Now, why did all horses get on their toes at the same time, or how did they get on the tips of their toes at all? Darwinism is to me a compound of utility and economy. But by what process of economy or utility did horses get on the point of their toes? To me, it is evidently the exclusive result of their Maker's will, and that the creation and government of the universe is an absolute despotism in all things."

This facer ought to settle the Darwinians; lest it should not, we subjoin another extract of like tenor:

"I found that a butterfly is an insect ornamented by scales, and that they are divided into day flies and night flies, and again divided into six thousand day or butterflies and sixty thousand night or moth flies, and that butterflies are purely and exclusively (so far as they are butterflies) things made for beauty by an agent or Maker who sees beauty of colors in the night, for there are sixty thousand kinds of night flies and only six thousand day flies. This led me to the undoubted belief that Darwinism applied to butterflies is worse than an error, for it leaves out the most important and essential part of the whole, which is, that the origin of species is the direct exclusive result of an intelligent design."

To the initiated the following will perhaps explain how some of Mr. Coutie's results were obtained:

"As the ways of this argument are so far from the ordinary beaten paths, my intent when writing it was to print in full along with it Newton's four rules of reasoning, pages 384 and 385, *Principia*, to show that this is in full and exact accord with them."

"This design led to a full, careful review of the men, their method and their particular results, that I found that these rules are wholly insufficient for my purpose. They are perfect for his purpose, but insufficient when applied to this paper."

This, so far as we are able to understand it, looks black for Newton.

Among other gems of style and statement, we have the following:

"The history of origin leads us far back into the distant past."

"What this subject learns from this observation of the heavens is that the same rules that govern the atoms."

"The density of the air is the result of its own weight."

The author has also discovered a few less important matters of detail. Among other things two new—what shall we call them; not elements for they are, according to our present notions, compound. The first of